

WHAT IS CLAIMED IS:

1. A gas valve, comprising:
  - a housing having a passageway with an upstream port and a downstream port;
  - a barrier disposed across the passageway, said barrier formed from a material which is porous to compressed gas but which substantially prevents a low-pressure liquid from advancing through the passageway downstream of said barrier.
2. The valve of Claim 1, further comprising a gas regulator in fluid communication with said passageway.
3. The valve of Claim 1, further comprising a filter.
4. The valve of Claim 3, wherein the filter is disposed in said passageway downstream of said barrier.
5. The valve of Claim 3, wherein the filter is disposed in said passageway upstream of said barrier.
6. The valve of Claim 1, wherein the barrier comprises a dome portion.
7. The valve of Claim 1, wherein the barrier is substantially immobile in an upstream-downstream direction when exposed to compressed gas.
8. The valve of Claim 1, wherein the barrier comprises a waterproof membrane.
9. The valve of Claim 1, wherein the barrier comprises an expanded polytetrafluoroethylene.
10. The valve of Claim 1, wherein the barrier comprises GORE-TEX™.
11. The valve of Claim 1, wherein the barrier is a rigid foam material.
12. The valve of Claim 1, wherein the barrier will not plastically deform when exposed to compressed air.
13. The valve of Claim 1, wherein the barrier plastically deforms when exposed to compressed air.
14. The valve of Claim 1, wherein the barrier comprises a nonmetallic foam material.
15. The valve of Claim 1, wherein the barrier is a membrane.
16. The valve of Claim 15, wherein the membrane comprises a slit.
17. The valve of Claim 15, wherein the membrane comprises a pinhole.

18. The valve of Claim 15, wherein the membrane comprises a cross.
19. The valve of Claim 1, further comprising a cap detachably coupled to the housing for securing the barrier to the valve.
20. The valve of Claim 19, wherein the cap comprises a threaded portion for securing the barrier to the valve.
21. The valve of Claim 19, wherein the cap comprises a snap for securing the barrier to the valve.
22. A gas regulator for use in regulating the flow of a compressed gas, the gas regulator comprising:
  - a valve, comprising:
    - a housing having a passageway with an upstream port and a downstream port;
    - a barrier disposed across the passageway, said barrier formed from a material which is porous to compressed gas but which substantially prevents a low-pressure liquid from advancing through the passageway downstream of said barrier; and
    - a gas pressure control member located downstream of said valve.
23. The gas regulator of Claim 22, further comprising a filter disposed in said passageway downstream of said barrier
24. The gas regulator of Claim 22, wherein the barrier comprises a dome portion.
25. The gas regulator of Claim 22, wherein the barrier is substantially immobile in an upstream-downstream direction when exposed to compressed gas.
26. The gas regulator of Claim 22, wherein the barrier comprises an expanded polytetrafluoroethylene.
27. The gas regulator of Claim 22, wherein the barrier comprises GORE-TEX™.
28. The gas regulator of Claim 22, wherein the barrier comprises a waterproof membrane.
29. The gas regulator of Claim 22, wherein the barrier is a rigid foam material.
30. The gas regulator of Claim 22, wherein the barrier will not plastically deform when exposed to compressed air.

31. The gas regulator of Claim 22, wherein the barrier plastically deforms when exposed to compressed air.
32. The gas regulator of Claim 22, wherein the barrier comprises a nonmetallic foam material.
33. The gas regulator of Claim 22, wherein the barrier is a membrane.
34. The gas regulator of Claim 33, wherein the membrane comprises a slit.
35. The gas regulator of Claim 33, wherein the membrane comprises a pinhole.
36. The gas regulator of Claim 33, wherein the membrane comprises a cross.
37. The gas regulator of Claim 22, further comprising a cap detachably coupled to the housing for securing the barrier to the valve.
38. The gas regulator of Claim 37, wherein the cap comprises a threaded portion for securing the barrier to the valve.
39. The gas regulator of Claim 37, wherein the cap comprises a snap for securing the barrier to the valve.
40. A valve for use with a gas regulator, said valve comprising:
  - a housing having a passageway with an upstream port and a downstream port;
  - a cartridge disposed in the passageway, said cartridge comprising:
    - a barrier formed from a material which is porous to compressed gas but which substantially prevents a low-pressure liquid from advancing through the passageway downstream of the barrier; and
    - a gas conditioner downstream of said barrier.
41. The valve of Claim 40, wherein the gas conditioner abuts the downstream end of the barrier.
42. The valve of Claim 40, wherein the gas conditioner comprises a filter.
43. The valve of Claim 40, wherein the gas conditioner comprises a first stage and a second stage downstream of said first stage.
44. The valve of Claim 43, wherein the first stage is a filter and the second stage comprises a composition of calcium hydroxide, sodium hydroxide, and water.
45. The valve of Claim 43, wherein the first stage is a filter and the second stage comprises DIVESORB™.

46. The valve of Claim 40, wherein the gas conditioner comprises a gas pressure control member.

47. A cartridge for use with a gas valve, said cartridge comprising:

a barrier formed from a material which is porous to compressed gas but which substantially prevents a low-pressure liquid from advancing through the passageway downstream of the barrier; and

a gas conditioner downstream of said barrier.

48. The cartridge of Claim 47, further comprising a gas regulator in fluid communication with said passageway.

49. The cartridge of Claim 47, wherein the gas conditioner abuts the downstream end of the barrier.

50. The cartridge of Claim 47, wherein the gas conditioner comprises a filter.

51. The cartridge of Claim 47, wherein the gas conditioner comprises a first stage and a second stage downstream of said first stage.

52. The cartridge of Claim 51, wherein the first stage is a filter and the second stage comprises a composition of calcium hydroxide, sodium hydroxide, and water.

53. The cartridge of Claim 43, wherein the first stage is a filter and the second stage comprises DIVESORB™.

54. The cartridge of Claim 43, wherein the gas conditioner comprises a gas pressure control member.

55. A valve, comprising:

a housing having a passageway with an upstream port and a downstream port;  
a barrier disposed across the passageway, said barrier formed from a material which is porous to compressed gas but which substantially prevents a low-pressure liquid from advancing through the passageway downstream of the barrier;

a gas conditioner disposed in said passageway downstream of said barrier.

56. The valve of Claim 55, wherein said gas conditioner abuts a downstream end of said barrier.

57. The valve of Claim 55, wherein a major portion of said barrier remains stationary as compressed gas passes through said barrier.

58. The valve of Claim 55, wherein the barrier is substantially immobile in an upstream-downstream direction when exposed to compressed gas.

59. The valve of Claim 55, wherein the gas conditioner prevents the barrier from advancing downstream when barrier is exposed to the compressed gas.

60. The valve of Claim 55, wherein the gas conditioner comprises a filter

61. The valve of Claim 55, wherein the gas conditioner comprises a first stage and a second stage downstream of said first stage.

62. The valve of Claim 61, wherein the first stage is a filter and the second stage comprises a composition of calcium hydroxide, sodium hydroxide, and water.

63. The valve of Claim 61, wherein the first stage is a filter and the second stage comprises DIVESORB™.

64. The valve of Claim 55, wherein the gas conditioner and barrier form a cartridge insertable into the passageway.

65. The valve of Claim 55, wherein the gas conditioner comprises a gas pressure control member.

66. A gas valve, comprising:

an inlet opening;

a passageway extending downstream of the inlet opening;

an attachment portion near said inlet opening, said attachment portion configured for connecting said valve to a pressurized gas source; and

a movable cap adapted to cover the inlet opening, the cap having a range of motion between a first position wherein the cap covers the inlet opening and a second position outside of the passageway wherein the cap is displaced from the inlet opening, the cap being biased towards the first position.

67. The valve of Claim 66, further comprising a gas regulator in fluid communication with said passageway.

68. The valve of Claim 66, wherein the cap is adapted to move from the first position to the second position when the valve is attached to a source of compressed gas.

69. The valve of Claim 66, wherein the cap is adapted to automatically move from the second position to the first position when the valve is disconnected from a source of compressed gas.

70. The valve of Claim 66, further comprising an attachment device for coupling the cap to the valve.

71. A cap for use with a gas valve having an inlet opening and an inlet sealing face surrounding said inlet opening, said cap comprising:

a cap body having an upstream side and a downstream side and a cap opening extending from said upstream side to said downstream side, said body forming a cap sealing face on said downstream side; and

a barrier disposed across said cap opening, said barrier formed from a material which is porous to compressed gas but which substantially prevents passage of low-pressure liquid downstream of a downstream end of said barrier.

72. The cap of Claim 71, further comprising a source sealing face disposed at the upstream side of said body.

73. The cap of Claim 71, wherein the source sealing face is similar to the inlet sealing face.

74. The cap of Claim 71, wherein the barrier extends across an upstream end of said cap opening.

75. The cap of Claim 71, wherein the barrier is at least partially disposed within cap opening.

76. The cap of Claim 71, wherein the barrier comprises an expanded polytetrafluoroethylene.

77. The cap of Claim 71, wherein the barrier comprises GORE-TEX™.

78. The cap of Claim 71, wherein the barrier comprises a waterproof membrane.

79. The cap of Claim 71, wherein the barrier is a rigid foam material.

80. The cap of Claim 71, wherein the barrier will not plastically deform when exposed to compressed air.

81. The cap of Claim 71, wherein the barrier plastically deforms when exposed to compressed air.

82. The cap of Claim 71, wherein the barrier comprises a nonmetallic foam material.
83. The cap of Claim 71, wherein the barrier is a membrane.
84. The cap of Claim 83, wherein the membrane comprises a slit.
85. The cap of Claim 83, wherein the membrane comprises a pinhole.
86. The cap of Claim 83, wherein the membrane comprises a cross.
87. A method of providing breathable air, comprising:
  - providing a gas valve with a barrier formed from a material which is porous to compressed gas, but which substantially prevents a low-pressure liquid from advancing through a passageway downstream of the barrier;
  - connecting a source of compressed gas to the valve;
  - flowing compressed gas through the barrier; and
  - conditioning the compressed gas to a condition wherein the gas may be breathed by a human.
88. The method of Claim 87, wherein the step of conditioning comprises reducing the pressure of the air from the source to a pressure suitable for breathing.
89. The method of Claim 87, wherein conditioning comprises adapting the air for use by a scuba diver.
90. The method of Claim 87, wherein conditioning comprises adapting the air for use in a respiration system.
91. The method of Claim 87, further comprising installing the gas valve in to a regulator.
92. A method of providing breathable air, comprising:
  - providing a gas valve with an inlet opening and a movable cap, the cap being biased toward a first position wherein the cap covers the inlet opening;
  - connecting a source of compressed gas to the valve;
  - while connecting the source of compressed gas, moving the cap to a second position wherein the cap is displaced from the inlet opening;
  - flowing compressed gas through the opening; and

conditioning the compressed gas to a condition wherein the gas may be breathed by a human.

93. The method of Claim 92, wherein conditioning comprises reducing the pressure of the air from the source to a pressure suitable for breathing.

94. The method of Claim 92, wherein conditioning comprises adapting the air for use by a scuba diver.

95. The method of Claim 92, wherein conditioning comprises adapting the air for use in a respiration system.

96. The method of Claim 92, further comprising installing the gas valve in to a regulator.